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The Relationship between International Trade and Economic Growth: An Empirical Finding from ASEAN Countries

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ABSTRACT
The aim of this study is to find the relationship between international trade and economic growth in ASEAN countries. Three independent variables used to measure economic growth include international trade, exchange rate and foreign direct investment. This study employed a Pedroni panel co-integration test to examine the data from 2004 to 2015. The results show that there is a long term co-integrated relationship between international trade and economic growth in ASEAN countries. International trade and foreign direct investment have a long term, positive impact on economic growth. Meanwhile, the exchange rate has a long term, negative influence on economic growth. In addition, there is an indirect relationship and bidirectional causalities between the GDP and international trade, as well as between the GDP and the exchange rate. On the other hand, there is a direct relationship and bidirectional causality between international trade and the exchange rate. The FDI leads to GDP, international trade, and exchange rates. The results suggest that international trade must be supported by government policies that aim to enhance the financing of new investment for economic growth. The implication of the government policy and business entities is discussed.

KEYWORDS
International trade
Economic growth
Exchange rate

INTRODUCTION

Currently, almost all countries in the world embrace the international trade including the Southeast Asian countries. In 1967, the countries located in Southeast Asia formed regional cooperation, known as the Association of Southeast Asian Nations (ASEAN). The goals of this organization are to enhance economic, trade, and socio-cultural cooperation among ASEAN countries, including Indonesia, Singapore, Thailand, Malaysia, Philippines, Brunei Darussalam, Vietnam, Myanmar, Cambodia, and Laos.

The global financial crisis stemming from the subprime mortgage crisis occurred in the United States at the end of 2007 had implications on the overall global economic condition, including ASEAN countries which, as other Asian countries, adhered to the open economic system. According to the economic perspective, the degree of openness towards international trade adopted by one country depends on the degree of openness displayed by the other country under consideration. Imports in one country

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mean exports for other countries. When one country experiences an economic crisis, it will affect other countries through import and export activities.

According to the Bank of Indonesia (2009), the global financial crisis has significantly impacted the trade among emerging market countries through a drastic bear in commodity prices associated with the weakening global demand. The decline of commodity prices resulted in a negative impact on the exports of some ASEAN countries, particularly Indonesia, Thailand, Vietnam and Malaysia. Therefore, it can be said that a global financial crisis can and will affect international trade activities, including imports and exports. This effect, combined with the related influences on the commodity prices, will further affect the economic growth of a country.

The global financial crisis also had an impact on foreign direct investment (FDI) in ASEAN countries. This condition destroyed incentives for those countries that relied on external borrowing to bolster their trade markets funds, such as Philippines, Indonesia, and other ASEAN countries in the Greater Mekong sub-region. Meanwhile, external sources of financing were also difficult to obtain due to the tight liquidity in the global financial market, which had turned sluggish during the crisis. The uncertainty surrounding of investments and the liquidity of commodities also caused many firms to be reluctant to expand their businesses.

In fact, the economy of Southeast Asia suffered a financial crisis from 1997 to 1998. This event became a lesson for Southeast Asian countries to face future crises, including the global financial crisis from late 2007 to 2009. However, the global financial crisis had caused a decline in exports in that region, which in turn, threatened the engine of economic growth of Southeast Asia. According to the World Bank (2018), the GDP in Southeast Asian countries declined during the global financial crisis from 2007 to 2009 and then increased after the crisis.

A review of the literature reveals that most studies have discussed the relationship between international trade and economic growth. However, there are still very few studies conducted about the relationship between international trade and economic growth, particularly in ASEAN countries. Moreover, considering the above issues, international trade plays an important role in the economic growth of a country. This study is, therefore, a topic of interest.

LITERATURE REVIEW

International trade and economic growth

International trade is able to encourage the economic growth of a country, as reflected in the GDP. According to the previous study of Habib (2017) and Penn World Table, international trade is defined as the sum of exports and imports over the GDP. International trade reflected in the export and import activities greatly affects the economic growth of a country. Most researchers suggest that exports will have a positive influence on economic growth. Zahonogo (2016) declares that trade openness or international trade has a positive and significant effect on economic growth. The study investigated the relationship between trade openness and economic growth on sub-Saharan Africa (SSA) by using a panel of data from 42 SSA countries from 1980 to 2012. The results suggest that trade openness can promote long-term economic growth. The results of Zahonogo (2016), which has the same topic and purpose, can support this research.

Another previous study from Adeleye (2015) states that international trade has a positive effect on economic growth and is also important in boosting economic growth. This is because exports, being used as one of the proxy variables of international trade, give positive and significant effects on economic growth. In addition, the previous study of El Khoury (2006) declares the same results, that openness in trade and economic growth has a positive and significant relationship, as reflected by the increase in the GDP. From all previous studies, it can be concluded that international trade has a positive, long-term relationship with the economic growth of a country. This present study serves as a supportive reference.

Nowadays, international trade is a rapidly growing activity of the global economy. The fast-paced economic growth, along with the increase in international trade, would be better if it is accompanied with stable political conditions and felicitous governmental economic policies in each country. Additionally, for accelerating its economic growth, a country is required to explore the sources of financing. When it has insufficient funds to invest in businesses, manufacturing, infrastructure, national development, or other expenditures, it may be obtained through FDI. International trade is not considered to be separable from the exchange rate, because the exchange rate is included in the international trade transaction.

DATA AND EMPIRICAL ANALYSIS

This study used panel data for ten ASEAN countries over the period 2004 to 2015. The selection of this period of time was determined by the availability of data related to this research, such as international trade, economic growth, exchange rates, and FDI. The ASEAN members consist of ten countries, including Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam (ASEAN, 2018). The econometric model can be shown as follow:

$$\Delta \ln logGDP_t = \alpha + \lambda ECM_{t-i} + \sum \beta_i \ln logGDP_{t-i} + \sum \psi_i \Delta \ln logINTRADE_{t-i} + \sum \varphi_i \Delta \ln logEXRATE_{t-i} + \sum \eta_i \Delta \ln logFDI_{t-i} + \mu_t$$

The gross domestic product per capita (GDP Per Capita) was adopted as a proxy estimation of economic growth and used as a dependent variable. This study used three independent variables, including international trade, exchange rates, and FDI. All these variables, including GDP Per Capita, were represented in logarithmic form. Among these variables, GDP Per Capita is denoted as *LOGGDP*, international trade is denoted as *LOGINTRADE*, the exchange rate is denoted as *LOGEXRATE*, and FDI is denoted as *LOGFDI*. Here, international trade is defined as the sum of exports and imports over GDP, while this study used the national currency against the US dollar for the exchange rate, which was taken from the International Monetary Fund (IMF) data. Foreign direct investment (FDI) was included in the model to capture the effects of external sources of investment on growth (Vehapi, 2015). The GDP Per Capita, international trade and FDI were obtained from World Bank data.

This study employed some methodologies to examine variables. The first step in examining panel co-integration was in the application of unit root tests. This study also applied Pedroni's panel co-integration test, a fully modified ordinary least squares test, a dynamic ordinary least squares test and utilized a panel vector error correction model.

The first step to examine the co-integration tests was to apply a unit root test. The function of this test is to check the stationarity of the variables. The series is non-stationary when the unit root exists in the data. The unit root test is necessary for knowing the order of integration to be continued on selecting an appropriate method for regression analysis. This study used four kinds of unit root tests to examine the stationarity of a series, including the Levin, Lin, Chu test (LLC), the Im, Pesaran, Shin test (IPS), the Augmented Dickey-Fuller test (ADF) and the Phillips Perron test (PP).

According to the previous study of Bidirici (2015), the most famous co-integration test for examining the co-integration of panel data is the Pedroni test (1997). Uddin (2017) also suggests that after getting the results of the unit root tests and finding that all the data are stationary, the Pedroni test should be applied as an appropriate test for checking whether or not the data have a long-term association. Thus, the present study also used the Pedroni test for examining the panel co-integration.

After confirming the existence of co-integration, the next step was to estimate the associated longterm co-integration parameters by applying both the FMOLS test and the DOLS test. According to Ghouali (2014), Pedroni proposes using the FMOLS test, while Kao and Chiang (2000) and Mark and Sul (2002) recommend the DOLS test as an alternative method to assess the panel co-integration.

Then, the last step in this study was the Panel Vector Error Correction Model (PVECM) test. Based on the previous studies of Apergies (2009), the function of the Panel Vector Error Correction Model (PVECM) test is to investigate the direction of the causal relationship among variables. This study used a panel-based Vector Error Correction Model (VECM) to identify the existence and direction of a long term equilibrium relationship, by considering an error correction through an assumed short term adjustment.

RESULT AND DISCUSSION

Unit root test result

As can be seen in Table 1, the economic growth level (*LOGGDP*) is not stationary in all methods, but it is stationary at the first difference, with a significance of 1%, which is considered very significant. It is the same case with international trade (*LOGINTRADE*) and the exchange rate (*LOGEXRATE*).

Both of these variables are stationary at the first difference, with a 1% significance using all methods of the unit root tests. The foreign direct investment (*LOGFDI*) has the same significance (1%) at the first difference for all the methods. Except for the PP unit root test, the FDI level is stationary with 1% significance. However, for the other three methods of unit root tests, FDI is stationary at the first difference with 1% significance.

From all of these methods, the results show that the economic growth (*LOGGDP*), international trade (*LOGINTRADE*), the exchange rate *(LOGEXRATE*) and FDI (*LOGFDI*) are all stationary at the first difference, I(1). Because of this, further tests were done, specifically, the co-integration test in order to find the long term relationship between these variables.

Table 1. The Panel unit root test results

Test	Loggdp	Logintrade	Logexrate	Logfdi
LCC (Levin, Lin, Chu)				
Level	0.993	1.543	2.011	-1.058
	[0.839]	[0.938]	[0.977]	[0.145]
First Difference	-8.992***	-9.164***	-12.604***	-4.820***
	[0.000]	[0.000]	[0.000]	[0.000]
IPS (Im, Pesaran, Shin)				
Level	3.485	0.550	3.576	0.889
	[0.999]	[0.709]	[0.999]	[0.813]
First Difference	-2.917***	-2.828***	-4.575***	-3.650***
	[0.001]	[0.002]	[0.000]	[0.000]
ADF – Fisher Chi – Square				
Level	3.160	8.998	7.233	15.425
	[1.000]	[0.982]	[0.995]	[0.751]
First Difference	43.640***	47.002***	58.229***	53.583***
	[0.001]	[0.000]	[0.000]	[0.000]
PP – Fisher Chi – Square				
Level	3.242	25.818	9.259	63.022***
	[1.000]	[0.171]	[0.979]	[0.000]
First Difference	86.934***	72.424***	94.339***	132.343***
	[0.000]	[0.000]	[0.000]	[0.000]

Note: The significance levels for (*, **, ***), are 10%, 5%, 1%, respectively. The *P-values* are given in square brackets.

Pedroni co-integration test result

Table 2 shows the seven different test statistics and their corresponding p-values. The first four are for within-dimension tests, and the last three are for between-dimension tests. The tests used for the within-dimension tests were the Panel v-Statistic test, the Panel rho-Statistic test, the Panel PP-Statistic test and the Panel ADF-Statistic test. Meanwhile, the tests used for the between-dimension tests were the Group rho-Statistic test, the Group PP-Statistic test and the Group ADF-Statistic test. The null hypothesis of the Pedroni (2004) co-integration test is the absence of co-integration, while the alternative hypothesis is the existence of co-integration.

Table 2 shows that at the 1% significance level, four out of the seven statistical tests reject the null hypothesis of no co-integration, suggesting that the variables in this study are mutually co-integrated with each other or have long-term relationships. Three of the seven statistical tests, including the Panel rho-Statistic test, the Panel PP-Statistic test, and the Group rho-Statistic test, have different results from the others, indicating that the variables in this study are not co-integrated. However, overall, most of the co-integration test results reveal that the all variables have a long term relationship or are mutually co-integrated. This finding supports the previous research of Uddin (2017), which states that if the sum of the calculated values of the statistical test results is greater than the critical values, then this denotes the rejection of the null hypothesis of no co-integration. Thus, it can be concluded that there is a long term, a co-integrated relationship between the variables.

Table 2. The Pedroni co-integration test results

Within Dimension	*t*-statistics	*p-value*
Panel v-Statistic	6.200***	0.000
Panel rho-Statistic	2.508	0.993
Panel PP-Statistic	-0.697	0.242
Panel ADF-Statistic	-2.027***	0.021
Between Dimension		
Group rho-Statistic	3.500	0.999
Group PP-Statistic	-8.315***	0.000
Group ADF-Statistic	-21.024***	0.000

Note: The null hypothesis is no co-integration among the four variables. The superscript *** indicates that the estimated parameters reject the null hypothesis with a significance of 1%. These tests employed the Newey-West bandwidth selection using the Bartlett Kemel Cross Method Statistic Probability.

FMOLS and DOLS test results

Based on the figures listed in Table 3, all the independent variables have a long term relationship with the dependent variable, that is, the economic growth. This relationship is strongly proved by the statistical significance of 1%, according to the result of the FMOLS tests. However, each variable has a different long-term impact on economic growth. It can be seen in Table 4 that both international trade and FDI have a positive impact on the long term economic growth. However, the exchange rate has a negative impact on the long term economic growth. The co-integration equation vector, according to the FMOLS test results, can be modeled by the following equation.

$$LOGGDP = 0.302\ LOGINTRADE - 0.467\ LOGEXRATE\ + 0.043\ LOGFDI$$

In words, the results show that the more a country engages in open trades, the more it will be able to increase its economic growth. In the presented case of the ten ASEAN countries, international trade activities consist of exports and imports. It would be better if a country has a surplus export because this will enhance the economic growth, as reflected in the GDP Per Capita. The results of this study support the previous conclusions of Zahonogo (2016) who argues that greater trade openness has beneficial effects on economic growth.

For FDI, the results show that it has a positive influence on economic growth. This is due to the fact that the existence of investment capital is the first step to boost exports. The results of this study also agree with the previous study of Latif (2018), who states that FDI has a positive relationship with the economic growth and that the countries receiving better FDI have the highest economic growth. On the contrary, the exchange rate has a negative impact on the long term economic growth. The results of this study do not disagree with the previous research of Cuestas (2018), who states that there is no direct link between the exchange rate and the long term economic growth.

Table 3. The FMOLS estimation results

Variables	Coefficients	*t*-statistics	*p-value*
Logintrade	0.302***	2.854	0.005
Logexrate	-0.467***	-4.221	0.000
Logfdi	0.043***	2.290	0.024

Notes: The superscript indicate that the significance level at 1%.

The second step was to examine the results of the DOLS test. The DOLS estimation shows the existence of a relationship, that the independent variables have a significant, long term influence on the dependent variable (economic growth). The results of the DOLS tests can be seen in Table 4 below.

Table 4. The DOLS estimation results

Variable	Coefficient	*t*-statistic	*p-value*
Logintrade	0.278***	2.566	0.011
Logexrate	-0.462***	-3.904	0.000
Logfdi	0.070***	3.411	0.001

Notes: The superscript indicates a significance level of 1%.

According Table 4, all the independent variables have a statistically significant (1%), long term influence on the dependent variable. This indicates that all three variables have a long term impact on economic growth (*LOGGDP*), but the impact of each of these variables is different. As can be seen in Table 4, only the exchange rate has a negative effect on the long term economic growth of the ten ASEAN countries. This effect is due to the uncertainty of the value of the national currency against the US Dollar, as the variable used as the exchange rate in this study. The equation resulting from the DOLS test is given as follows.

$$LOGGDP = 0.278\ LOGINTRADE\ - 0.462\ LOGEXRATE\ + 0.070\ LOGFDI$$

Therefore, the FMOLS and DOLS tests have the same results for the long term relationship between the dependent and the independent variables. For this study, both international trade and FDI have a positive impact on the long term economic growth of the 10 ASEAN countries. Meanwhile, the exchange rate has a negative effect on the long term economic growth of the ten ASEAN countries.

The results of the panel vector error correction model estimation

This study also discusses the significance of the coefficients of the error correction term (ECT) that reflects any indirect effects among the variables. The results shown in Table 5 indicate that the coefficients of the ECT for all the dependent variables, except for FDI, are at a significant level of 1%, including the economic growth, international trade and the exchange rate. This shows that international trade and the exchange rate will affect economic growth indirectly. Regarding the direct and indirect effects of causality indicated by this study, there is bi-directional causality between the GDP and international trade, as well as between the GDP and the exchange rate.

Based on Table 5, international trade has significant, direct effects on the exchange rate, with a significance of 5%,so there is a bidirectional relationship between international trade and the exchange rate. In addition, the results indicate that FDI

plays an important role in ASEAN countries. FDI leads the GDP, international trade and the exchange rates, and this is proved by the results of ΔLOGFDI at 1% significance level. This study also supports the previous research of Nistor (2014) which mentions that FDI can be a supporting factor for a country to compete in international trade, and to maintain its economic growth. Besides offering support to the previous studies, these results also suggest that each of the ASEAN countries first needs to create the conditions of a stable political-economic climate that is conducive to investment, such that the country will be able to attract sources of foreign funding more easily.

Table 5. The PVECM estimation results

Independent Variables	Dependent Variables			
	Δ(Loggdp)	Δ(Logintrade)	Δ(Logexrate)	Δ(Logfdi)
ECT	-0.037***	-0.197***	-0.226***	-0.035
	[-2.639]	[-3.189]	[-3.460]	[-0.354]
Δ(Loggdp (-1))	0.106	-0.797	-0.949	0.169
	[0.749]	[-1.287]	[-1.451]	[0.170]
Δ(Loggdp (-2))	0.084	0.526	0.337	0.210
	[0.631]	[0.909]	[0.551]	[0.226]
Δ(Logintrade (-1))	0.139	1.295**	1.277**	1.256
	[1.061]	[2.272]	[2.122]	[1.375]
Δ(Logintrade (-2))	-0.067	0.572	0.596	0.229
	[-0.566]	[1.106]	[1.091]	[0.277]
Δ(Logexrate (-1))	-0.155	-1.161**	-1.230**	-1.159
	[-1.239]	[-2.128]	[-2.134]	[-1.326]
Δ(Logexrate (-2))	0.046	-0.670	-0.711	-0.337
	[0.406]	[-1.341]	[-1.348]	[-0.420]
Δ(Logfdi (-1))	-0.005	-0.014	-0.016	-0.554***
	[-0.312]	[-0.186]	[-0.201]	[-4.519]
Δ(Logfdi (-2))	-0.022	-0.070	-0.060	-0.322***
	[-1.346]	[-0.987]	[-0.808]	[-2.830]

Note: The t-statistics are given in square brackets, and the superscript *** denotes a significance of 1%.

CONCLUSION & BUSINESS IMPLICATION

This study investigates the relationship between international trade and economic growth in ASEAN countries. Three independent variables were used, namely international trade, the exchange rate and FDI, whereas the dependent variable was the economic growth. This study employed the Pedroni panel co-integration test to examine the long term relationship among these variables by using annual data of ten ASEAN countries taken from 2004 to 2015. The results are concluded as follow.

The results of the Pedroni panel co-integration tests show that there is a long term relationship between international trade, the exchange rate and FDI with the economic growth in ten ASEAN countries. According to the FMOLS and DOLS test results, international trade and FDI have positive effects on the economic growth in ten ASEAN countries, while the exchange rate has a negative impact on economic growth. In addition, there are indirect relationships and bidirectional causalities between the GDP and international trade, as well as between the GDP and the exchange rate. On the other hand, there is a direct relationship and bidirectional causality between international trade and the exchange rate. FDI leads the GDP, international trade and exchange rates.

As many know, international trade is one of the main engines of economic growth in a country and has an important role in increasing the GDP as well as the overall economic welfare of a country. So far, the ASEAN countries have formed the ASEAN Economic Community (AEC), but the implications of each country's free trade policies still remain under debate. This study supports certain motives for policy implementations, considering how the global financial crisis caused a decline in exports and GDP, and thereby impacted the economy of ASEAN countries, particularly in Thailand, Philippines, Malaysia, and Indonesia, which are undergoing a political transition process from being authoritarian to democratic. Therefore, it is recommended that the ASEAN countries should maintain their political stability and also devise strategic policies to encourage openness in trade. Specifically, the government can decrease tariffs on imports and facilitate the export of goods by offering policies which raise intensive export activities. Such policies can increase the economic activity resulting from international trade for each ASEAN country.

In a global economy, one country's economy can affect other trading partners. If a nation is in a period of economic expansion, it may purchase goods and services from other countries, promoting expansion in those countries. One of the government's efforts to deal with international trade is protectionism. This is the practice of the government putting limits on foreign trade to protect its own businesses at home. To limit competition from other countries, governments develop trade barriers, such as tariff, a quota or an embargo.

Moreover, the global economy creates a diverse culture for business. As companies trade worldwide, they must be aware of different cultures and business practices. Each country has its own rules for etiquette, business customs and personal interaction. Therefore, companies must improve their human resource capabilities, product qualities, prices and promotions in order to compete in international trade. In addition, business people should comply with the rules in the country where their business is running.

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